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EXAMINER

IM, JUNGHWA M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 05/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/036,955

Applicant(s)

MAYUZUMI, SATORU

Examiner

Junghwa M. Im

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claims 1-3, 17 and 21-23 are objected to because of the following informalities.

Claims recite "as seen in plan view" which appears to be referring to a figure which is not a part of the claim and not shown or illustrated in the claims.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21-22 are rejected under 35 U.S.C. 112, second paragraph because claims recite the limitation "said sidewalls". There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 6, 7, 9, 11, 13, 14, 16 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Iguchi et al. (U.S. Pat. No. 5,734,185), hereafter Iguchi.

Regarding claims 1 and 21, Figure 1(a) of Iguchi shows a semiconductor device comprising: a semiconductor substrate 1, a gate insulating film 17, a gate electrode 19 formed on said gate insulating film and having a portion increasing upward in the length along a gate length direction, said gate electrode further having a visor portion, a side wall 16 formed on a side the gate electrode, so as to be covered behind a visor of the gate electrode as seen in plan view; and an interlayer insulation film 33 in Fig.6(p) covering the gate electrode 20 and being in contact with said side wall, and wherein the sidewall 16 is formed of at least two insulating films 15, 3, 2, and each of the insulating films contacts both the interlayer insulating film and the gate electrode and the insulation films contact each other.

In addition, an interlayer insulation film covering the gate electrode and contacting the side wall would have been inherent as shown by an insulator 33 in Fig.6(p), in order to support upper layers including a gate contact electrode 20, which is necessary for a functioning device.

Regarding claims 3 and 23, Figure 1(a) of Iguchi shows a semiconductor device comprising: a semiconductor substrate 1, a gate insulating film 17 on said semiconductor substrate, a gate electrode 19 formed on said gate insulating film and having a portion increasing upward in the length along a gate length direction, said gate electrode further having a visor portion, and a side wall 16 formed on a side surface of the gate electrode so as to be covered behind a visor of the gate electrode as seen in plan view, said side wall 16 (15, 3, 2) being formed of a lamination of at least two different insulation films having different etching properties (col. 13, lines 24-25), each of the insulating films 15, 3, 2 contacts both the interlayer insulating film and the gate electrode 19 and the insulation films contact each other.

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Regarding claims 4 and 6, Figure 1(a) of Iguchi et al. show the gate electrode 19 comprises a lower part substantially constant in the length along said gate length direction, and an upper part on said lower part increasing upward in the length along said gate length direction.

Regarding claims 7 and 9, Figure 1(a) of Iguchi et al. show the width of the visor portion is substantially constant and greater in length along the gate length direction than the upper or lower parts.

Regarding claims 11 and 13, Figure 1(a) of Iguchi shows the side wall is formed on both a side surface of the upper part and a side surface of the lower part.

Regarding claims 14 and 16, Figure 1(a) of Iguchi shows a side surface of the upper parts forms a tapered slope.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 5, 8, 10, 12, 15 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iguchi et al. as applied to claims 1, 3, 4, 6, 7, 9, 11, 13, 14 and 16 in view of Kim (U.S. Pat. No. 6,204,538)

Regarding claims 2, 10 and 22, Figure 1(a) of Iguchi shows a semiconductor device comprising: a semiconductor substrate 1, a gate insulating film 17 formed on said semiconductor

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substrate, a gate electrode 19 formed on said gate insulating film and having a portion increasing upward in the length along a gate length direction, said gate electrode further having a visor portion, a side wall 16 formed on a side surface of the gate electrode so as to be covered behind a visor of the gate electrode as seen in plan view, an interlayer insulation film 33 in Fig.6(q) covering the gate electrode 20; and a contact 34 formed in interlayer insulation film 33 in Fig.6(q), wherein the sidewall 16 is formed of at least two insulating films 15, 3, 2 and each of the insulating films contacts both the interlayer insulating film and the gate electrode, and the insulation films contact each other.

Iguchi discloses a substantially identical device recited in pending claim except limitation over the contact in a diffused layer on the substrate.

However, Fig. 4C of Kim shows contact 60b extending from gate electrode 30b1 to drain region 40b, and the contacting the vertical side wall of the gate electrode.

It would have been obvious to include a similar contact in the device of Iguchi in order to implement an SRAM cell having this particular circuit connection of gate shorted to drain as discussed at col.4, lines 28-37 of the specification of Kim.

Regarding the limitations for the claims 5, 8, 12 and 15 are discussed above in claims with 35 USC § 102 rejection.

### ***Response to Arguments***

Applicant's arguments filed on April 2, 2003 have been fully considered but they are not persuasive.

Applicant contends that Iguchi does not teach “two insulating films forming the side *walls* are in contact with the interlayer insulating film and the gate electrode.” Examiner would like to point out that Figure 1(a) of Iguchi clearly shows a side wall 16 with dielectric layers 15, 3, 2 that are in contact with the interlayer insulating as discussed in the rejection above. Applicant further states “ [I]guchi teaches a side wall 16 with *three* insulating films 16a, 15, 3 and 2, where *only four* of the films contact the gate electrode and the interlayer insulating film (Figures 1 and 16).” First, Iguchi’s side wall structure 16 covers all four sides of the gate electrodes, therefore this structure would read on the limitation “sidewalls.” Note that Iguchi’s side wall structure 16 is composed of four layers of which at least three layers are in contact with interlayer insulating layer. Examiner would like to point out, Applicant actually agrees that indeed, *at least two* insulating films (as recited in the amended claims) forming a side wall are in contact with the interlayer insulating film and the gate electrode because of Applicant’s own admission that four of the insulating films of Iguchi contact the gate electrode and the interlayer insulating film. Examiner also would like to point out that insulating films of Iguchi are formed on both sides of the gate electrode and are made of the identical material to the insulating films of Applicants.

Finally, the teaching of Kim is introduced to merely show a contact extension from the drain to the gate electrode in a manner recited in the pending claim. As discussed previously, Iguchi clearly shows the limitations as recited above except the contact extension, and one of ordinary skill in the art would incorporate this contact feature in the device of Iguchi to make a functional device.

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi  
May 5, 2003

Tom Thomas